Operating manual

E3907

Universal handheld measuring device with datalogger

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ONE NAME. ALL SOLUTIONS.

Manufacturer, Location	Tecsis GmbH, Germany- 63073 Offenbach am Main
Valid for	E3907 handheld measuring device with datalogger
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Change notice	Subject to technical changes.

1. Safety notes

1.1 General references

The enclosed operating instruction is intended for technically qualified personnel who has corresponding knowledge in the field of measurement and industrial process & control technology.
The precise information about all safety notes contained in this operation manual and warnings, as well as its technical implementation are precondition for the safe installation, the initiation, the secure operation and the maintenance of **tecsis** devices. For this purpose it is absolutely necessary that all measures are carried out by qualified personnel. All persons concerned with the project planning, installation and service of tecsis devices, must be familiar to the security concepts in automatic control and should be qualified in this sense.
For clarity reasons, the enclosed operating instruction cannot represent complete details in all conceivable cases of applications for the handling of tecsis devices. Further, we cannot consider the entire types of installation, handling and maintenance. If you wish further information or if special problems occur, which were not ,or not at length represented in this operating instruction, contact us, please..

The oblivion of the safety notes can and will lead to material damages, body injuries and death.
Tecsis devices may only be operated in accordance with the applications described in this operation manual. Built-in devices may only be operated in appropriate installations.

With the connection and the initiation of the device, the customer accepts the general sale and delivery conditions of **tecsis GmbH**. Further, he accepts eventually incomplete operation manuals. The information described is without guarantee. Errors and changes are reserved.

Intended Purpose, Improper Usage

A tecsis device is used for displaying, processing and controlling or regulation of processes. It shall not be used as the only tool for the prevention of dangerous states to machines and plants. Machines and plants must be constructed in such a way, that erroneous states cannot lead to a dangerous situation for the staff (e.g. by independent limit switches, mechanical locking devices). It must be guaranteed in particular that device-operating errors, its malfunction or it's breakdown do not lead to great property damages or danger for the staff. Consequently, the device then can be used to prevent the machine or the technical installations from error conditions.
It is also important that the use of devices does not endanger precautions for the safety of technical installations.
Emergency-off settings must remain effective in all operation modes.

Installation Notes

tecsis devices must be installed and connected by compliance with the relevant DIN- and VDE-norms. They must be installed in such manner that an unintentional use is sufficiently excluded. The corresponding hardware and software safety precautions are to be observed in such manner that an interruption of the supply and signal cables cannot lead to an undefined or dangerous state. Supply and signal cables must be installed in such way, that disturbing signals (e.g. inductive or capacitive intersperses) will not cause derogations to the function of tecsis devices.

Disturbance, Maintenance and Repair Notes

The devices do not contain parts which can be maintained on the customer side. Repairs shall be carried out by tecsis exclusively.
If assuming that a safe operation of the device is not possible anymore, it must be closed down and protected against unintentional handling immediately. This, in particular, applies:

- If the device shows visible damages
- If the device is no longer operative

- If parts of the device are loose or slack
- If the connection cables show visible damages

Furthermore, we point out that all obligations of tecsis exclusively result from the respective sales contract in which the guarantee has been conclusively settled.

1.2 Intended use

Tecsis devices shall be used exclusively for measurement tasks and directly related control tasks. Any other usage is considered as not intended.

1.3 General dangers

The equipment is state of the current safety requirements. Residual risks arising from the machine when it is operated by untrained personnel and operated inappropriately. Any person who is in charge of installation, operation, maintenance and repairs of the device has to read the manual and especially the safety instructions must been read and understood**.**

1.4 Residual dangers

Safety engineering considerations of measurement technology have to be planned by the system designer / equipment providers / operators to realize and take responsibility for that residual risks and to keep them as low as possible. The relevant regulations and laws must be observed. Residual risks or dangers associated with the measurement device should be noted.

1.5 Notes identification

Should there be any residual dangers in working with the device, this manual will refer to it with following signs:

Warning:
Possible risk of serious or life-threatening injuries. The accident prevention regulations have to be recognized.

Attention:
Indicates a potential risk for damage to the product, process, person or environment.

Notation:
Additional information.

Important:
Reference to more detailed technical information.

1.6 Health and safety rules

To make sure our products cause no eventual risks or health threads, please mind the following health and safety rules:
1. Please read all relevant sections of these instructions carefully before beginning work.

2. All warning labels on containers and packages must be observed.
3. Installation, operation, maintenance and repair work may only be performed by trained personnel in accordance with the instructions given. If one of these instructions is not met, the users of the product are solely responsible for all consequences

4. Before opening the equipment, it must be disconnected from any supply.

1.7 Qualified personnel

Qualified personnel are persons who are familiar with the installation, operation, maintenance and upkeep of the equipment and have the necessary qualifications. The device may only be used by qualified personnel according to the technical data in connection with the special safety rules and regulations.

1.8 Technical changes

The product may not be changed constructive without our. Any modification shall exclude our liability for any resulting damages. Repairs and modifications to the circuit boards are prohibited.

2. References

The following documents contain reference information about the E3907 handheld measuring device:

- AE 984.pdf, Datasheet of the E3907

3. Introduction

This manual describes the features and installation procedures for the E3907 with firmware version 3.

3.1 Brief description

The E3907 is a DC measuring amplifier for passive or active sensors. A flexible data logger can store up to 3000 measured values with time and date. Mobile operation is possible by battery or accu operation, however, it can also be operated with a power unit. Measuring or logging values are transmitted via an RS-232 interface to a pc or printer. 10 parameter sets for sensors are available. There, in each case, the calibration data , the sensor designation and the physical unit are being stored. Functions such as tare, min./max.-recall and min./max.-delete are available during the measurement procedure. Via a trigger input the data logger or the interface can be controlled externally.

If the E3907is being delivered with one or more sensors, these sensors will be in-calibrated to the E3907 and are immediately ready for operation. An assignment of sensors to the corresponding parameter set is documented on the rear of the device

3.2 Power supply

Mains operation:

Power supply:	6V DC, min. 1,8A
Fuse:	Self-reset-able fuse 1,5A
Under-Overcut:	Can cause measurement errors or defects.
Stress peaks:	Be derived using protection components.
Voltage dropouts:	Voltage dropouts up to 10ms are without consequences.

Warning:

Remove batteries when using external power supply!

The E3907 must only be used with ground reference voltage supplies, switching power supplies without earth reference can cause measurement errors.

Battery Operation:

Battery operation:	4 x Typ: Mignon AA 1,5V
Accu operation:	4 x Typ: NiMH Mignon AA mit min. 1500mAh und 1,2V

The battery charging time for a battery capacity of 2.7 Ah approximately 9-10 hours. The constant charging current for charging the battery is approximately 290mA. The end of charging process will be recognized with a minus delta peak method (overcharge protection). For rapid charging of the batteries is an external battery charger (eg Ansmann 4 - 6) recommended. The batteries can be charged at off, and while the E3907 is running.

Power supply: If the permissible battery voltage falls below the indicator starts blinking

3.3 Safe and proper use

Attention:

- Protect the device from moisture, condensation, rain, snow...
- Protect the device from direct sunlight
- Protect the device from dust and dirt
- Protect the device from high or excessive ambient temperature
- Protect the device from excessive vibration.

3.4 Dimensions - Weight

Dimensions in mm: LxWxH: 200x100x40 Weight: 0,5kg

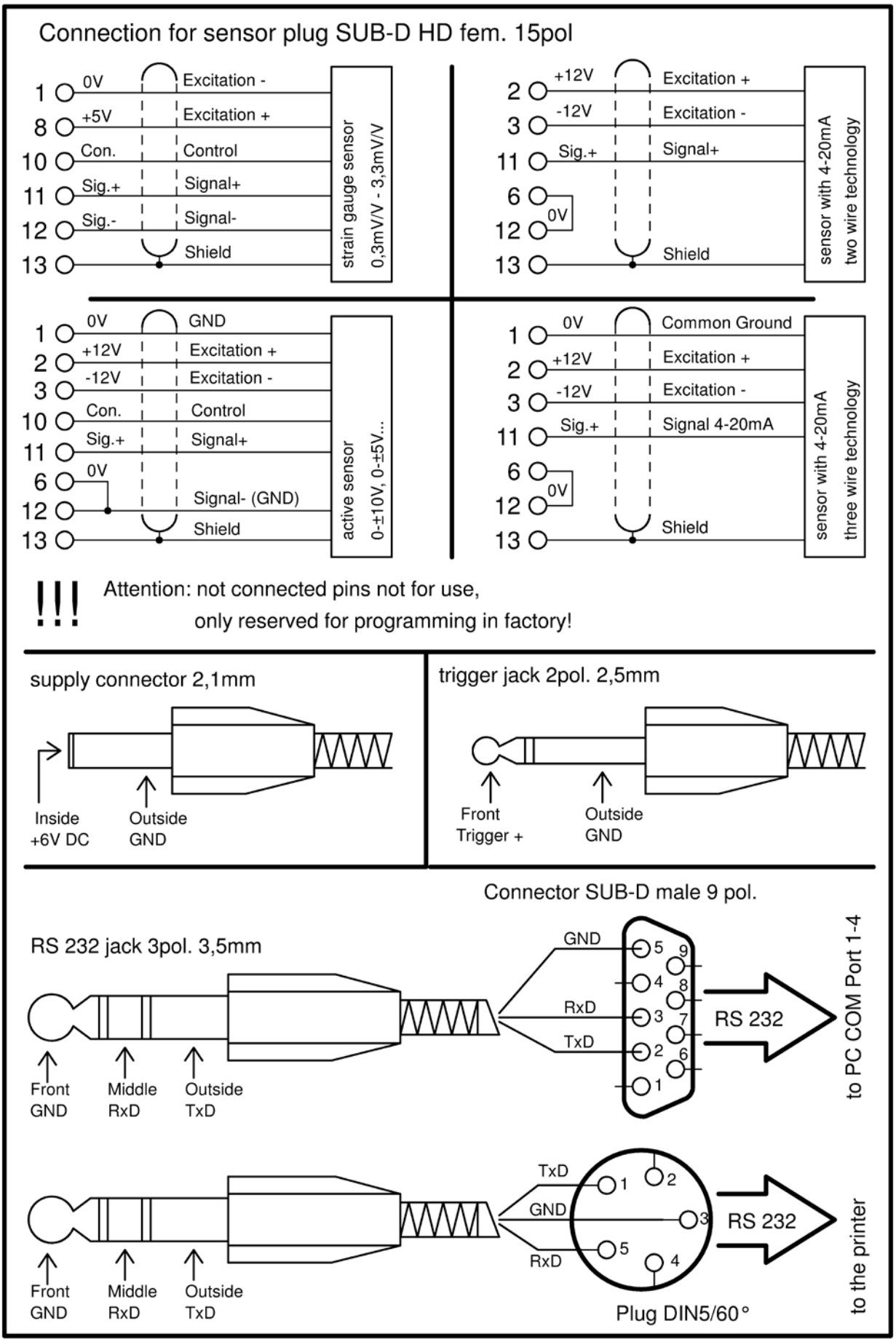
4. Instructions

4.1 Connection description

Key assignment:

ENTER:	Switch on the device Confirm, one step forward in the menu
ESC:	Switch off the device Exit, one step back in the menu
▲**:**	Scroll up
▼**:**	Scroll down

USB:	USB-Socket for:	USB-Connector Type B
RS232:	RS232-Socket for:	3,5mm jack 3pol.; front: GND; middle: RxD; outside: TxD
6V DC:	Supply socket:	2,1mm supply connector; inside: +6V DC; outside: GND
Trig:	Trigger jack for:	2,5mm Klinke 2pol.; Vorne: Trigger+; Außen: GND
SENSOR:	Sensor socket for:	SUB-D HD 15pol.

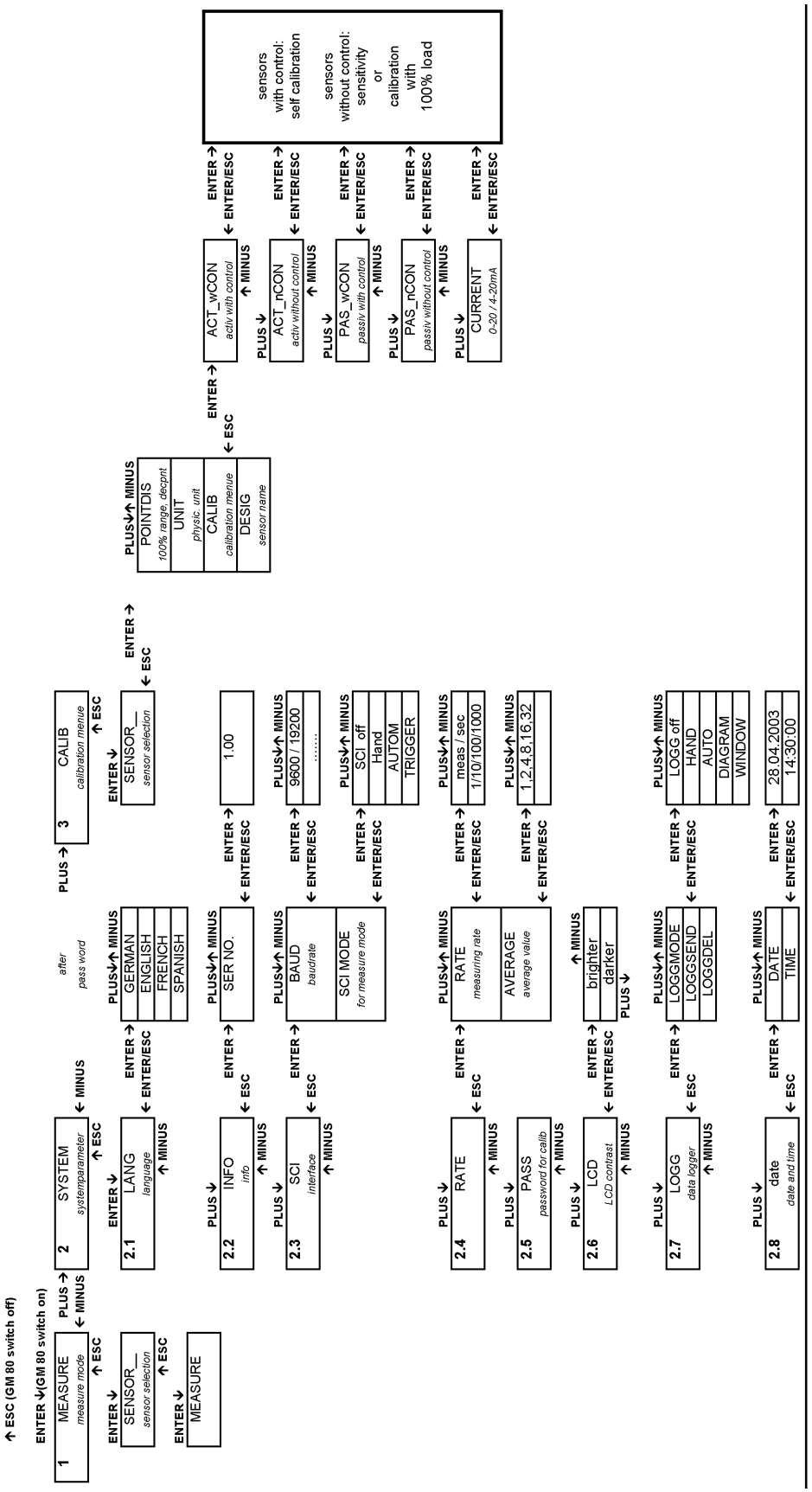

Connection for sensor plug SUB-D HD fem. 15pol
1 0V Excitation -
8 +5V Excitation +
10 Con. Control
11 Sig.+ Signal+
12 Sig.- Signal-
13 Shield
strain gauge sensor 0,3mV/V - 3,3mV/V
2 +12V Excitation +
3 -12V Excitation -
11 Sig.+ Signal+
6 0V
12 0V
13 Shield
sensor with 4-20mA two wire technology
1 0V GND
2 +12V Excitation +
3 -12V Excitation -
10 Con. Control
11 Sig.+ Signal+
6 0V
12 Signal- (GND)
13 Shield
active sensor 0-±10V, 0-±5V...
1 0V Common Ground
2 +12V Excitation +
3 -12V Excitation -
11 Sig.+ Signal 4-20mA
6 0V
12 0V
13 Shield
sensor with 4-20mA three wire technology
!!! Attention: not connected pins not for use,
only reserved for programming in factory!
supply connector 2,1mm
Inside +6V DC
Outside GND
trigger jack 2pol. 2,5mm
Front Trigger +
Outside GND
Connector SUB-D male 9 pol.
RS 232 jack 3pol. 3,5mm
Front GND
Middle RxD
Outside TxD
GND
RxD
TxD
RS 232
to PC COM Port 1-4
TxD
GND
RxD
RS 232
to the printer
Plug DIN5/60°

4.2 Switching on the device

Press the **ENTER** button to switch on the device.

4.3 Menu description

4.3.1 Brief handling overview E3907



4.3.2 Menu description

1 MEASURE	**Measuring mode**
SENSOR__	Sensor selection for measuring mode, sensor 0-9 Here the sensor parameter set for the measurement is being selected. The sensor parameter set must match the connected sensor.
2 SYSTEM	**All system parameters are being stored in this menu column.**
2.1 LANG	**Language adjustment**
	The menu language can be chosen in German, English, French or Spanish
2.2 INFO	**Information query was configured factory-sided an is not variable**
VERS NO.	Software version
2.3 SCI	**Interface configuration**
BAUD	Baud rate adjustment must be conform with the receiver (pc or printer).
SCI MODE	Interface configuration only refers to the measuring mode, not the logg mode!
OFF	Interface off
HAND	At key stroke **ENTER** the measured value is issued.
AUTO[1]	Interval time, adjustable from 10ms to 1h (at high measuring rate only possible with highest baud rate)
TRIGGER	At impulse on trigger input the measured value is issued.
INTERFAC	Auswahl der zu verwendenden Schnittstelle
USB	USB interface is activated
RS232	RS232 interface is activated
2.4 RATE	**Measuring rate and average value**
RATE	Measuring rate adjustment can be chosen between 1/s and 1000/s. At fast courses (screw joint, insert press...) always choose a fast measuring rate, e.g. 1000/s, at very slow courses a small rate, e.g. 1/s.
AVERAGE	Forming an average value, the numbers indicate by how many measurements an average value is accumulated. Applicable at e.g. vibrations, control oscillations....
2.5 PASS	**Password query**
	After entering the **password 9373** it is possible to enter menu **3 CALIB** . There the sensor parameters can be modified.
2.6 LCD	**LCD-contrast adjustment**
	If the LCD becomes unreadable by external influences e.g. solar radiation, heat or cold, the LCD-contrast can be corrected here by using the ▲ or ▼ key
2.7 LOGG	**Data logger adjustments**
LOGGMODE	Data logger configuration.
OFF	Off-switch for logger operation, by this the measuring mode is possible only.
HAND	At each key stroke on **ENTER** a logg value is being taken over.
AUTO	Adjustment of the measuring intervals.
DIAGRAM	With each increasing flank of the trigger signal a logg value is being taken over.
WINDOW	The window operation is being started by an increasing trigger flank and can only be finished by a decreasing flank.
LOGGSEND	Logger values are issued through the interface, press **ENTER** twice.
LOGGDEL	Logger values are deleted, beforehand there will be a safety query whether the buffer should be deleted.
2.8 DATE	**Date and time adjustment**
DATE	Date
TIME	Time
3 CALIB	**Calibration menu**
	this is active only, if the password has been entered correctly in **2.5PASS**. For the calibration the sensor needs to be connected to the sensor socket.

[1] If the SCI → AUTO interval is shorter than the set measuring rate, then the interface displays the same output until a new value is recorded.

Sensor__	Sensor number or name of the sensor which is to be calibrated.
POINTDIS	Measuring range with decimal indication of the sensor, e.g. 100,0; 200,0; 63,00;...

	Call menu "POINTDIS", after pressing **ENTER** the final value of the sensor can be entered, by ▲ or ▼ the numeric character can be edited, by **ENTER** the next figure can be edited, if all figures are edited, by ▲ and/or ▼ the comma will be shifted. For the completion of the input press **ENTER**, thereafter the final value is being logged in the E3907
UNIT	Input of the physical unit, e.g. Kg, Ncm, t, gr, kN, N•m, bar...
DESIG	Name of the sensor e.g. sensor 1,2,3, silo, tank, mixer, balance1, motor, test1..
CALIB	Selection of the sensor type (active, passive, 4-20mA, with or without calib. control..)

4.4 Operating example

- The E3907 is switched on by pressing **ENTER**

- Control time and date in SYSTEM menu or adjust if necessary

- Adjust language
Call menu 2 SYSTEM – 2.1 LANG. When **ENTER** button was pressed, the 3907 is in the selection mode. With keys ▲ and/or ▼ the language can be selected. With **ENTER** the selected language will be stored. With **ESC** the selected language will be discarded.

- Adjust time
Call menu 2 SYSTEM – 2.8 DATE. When **ENTER** button was pressed TIME will appear on the LCD. Press **ENTER** again and the time can be adjusted. With ▲ and ▼ the hours can be adjusted. After **ENTER** the minutes can be adjusted with ▲ and ▼ . With **ENTER** the selected time will be stored. With **ESC** the selected time will be discarded

- Change to the measuring mode
From menu 1 MEASUR by pressing **ENTER** the list of all sensors is called. With ▲ and/or. ▼ a sensor parameter set is being chosen. With **ENTER** the GM 80 is being adjusted to this sensor parameter set. With **ESC** it is possible to switch back to menu 1 MEASUR from any mode.

- Change measuring rate by measuring mode
The measuring mode can be left by pressing **ESC**. After pressing **ESC** again, the GM 80 will be in menu 1 MEASUR. From there the menu 2 SYSTEM – 2.4 Rate can be called. Select RATE by key ▲ and/or ▼ . By pressing key **ENTER** the set measuring rate is being displayed first. By key ▲ and/or ▼ a new measuring rate can be adjusted. By **ENTER** the new measuring rate will be taken over, by **ESC** the new measuring rate will be discarded..

- Switch off E3907
E3907 is switched off, when **ESC** button is pressed >3 seconds.

4.5 Measuring with the E3907

4.5.1 Selected sensor

Force sensor with measuring range:	200KN
Sensitivity	2mV/V
Designation e.g.:	Press
Parameter set: Sensor no.:	3
Option:	100% Calibration control

4.5.2 Parameters of a Sensor

After entering the password (9373) in menu 2SYSTEM-2.5PASS, the sensor can be installed in the calibration menu. Following parameters are possible:

Sensor__	Sensor no. 3 , Sensor 0 – 9 possible
POINTDIS	200,0 Match meas. range and decimal point (max. 9999)
UNIT	_kN, 1 – 3 digit unit possible
DESIGN	Press, up to 8 digit name (or numbers) arbitrary
CALIB	PAS_wCON , Select Passive with cal. control. See data sheet of sensor
0% LOAD	Unload sensor, 0% value of sensor is assigned to display
100% CON	Autom. Calibration, 100% value of sensor is assigned to display for example 200,0 kN
SAVE	**ENTER** or **ESC , Confirm** or **discard**

4.5.3 Measuring with the E3907

In order to be able to now measure with this sensor, the sensor " Press" is selected in the measuring mode. During a measurement, a minimum and maximum value buffer can be called with the ▼ key. The respective displayed minimum or maximum value can be deleted by **ENTER**.
If the measured value shall be sent through an interface to a pc or printer, the baud rate must be adjusted to the receiver and at SCI-MODE the operating mode must be chosen. For example: HAND, a measured value with time is displayed during every keystroke on **ENTER** while measuring.
For data logging, adjust operating mode in the logger mode, e.g. choose AUTO and interval time e.g. 10 sec and change to measuring mode. A measured value with time is now stored every 10 sec. In mode LOGGSEND, these data can then be sent through the interface.

Notation:
When running the device via USB port, the baud rate must be set correctly. This must match the baud rate of the virtual com port on the receiving PC.

4.6 Serial interface

The E3907 handheld instrument uses for the serial data transfer either a RS232 or a USB interface. The USB interface is managed on the PC as a virtual COM port. For the use of the USB port, the PC must have a Windows operating system (2k, XP, Vista, 7) and it must be installed the USB drivers from tecsis. After installing the drivers, the virtual COM port below can be used as described below.

4.6.1 Transfer rate / specification RS232 (V.24) / USB

Parity:	**none**	
Number of data:	**8 (1Byte)**	**8N1**
Stoppbit:	**1**	
Baudrate	**adjustable (2400; 4800; 9600; 19200; 38400; 115200 Baud)**	

Even in USB mode, the baud rate in the E3907 handheld device and the connected device must match.

4.6.2 Operation via the serial interface

Through the serial interface, measurement values can be issued singly or automatically by the E 3907.
The commands can be sent to the E 3907 via a terminal program or PLC.

If the E3907 is in the measuring mode, following commands are available:

4.6.2.1 Command overview

ASCII	HEX	Description
0	0x30	Query continuous measured value (signed integer)
1	0x31	Query maximal value (signed integer)
2	0x32	Query minimal value (signed integer)
3	0x33	Tare display
4	0x34	Reset maximal value
5	0x35	Reset minimal value
6	0x36	Actuate calibration control for sensors with 100 % control resistance
7	0x37	Switch off calibration control for sensors with 100 % control resistance
A	0x41	Read-Out datalogger
B	0x42	Delete datalogger
C	0x43	Read-Out current sensor parameter
D	0x44	Read-Out status
E	0x45	Read-Out complete status
g	0x67	Change protocol setup
k	0x6B	ENTER
l	0x6C	PLUS
m	0x6D	MINUS
n	0x6E	ESC

Outside of the measuring mode following commands are available:

ASCII	HEX	Description
A	0x41	Read-Out datalogger
C	0x43	Read-Out current sensor parameter
D	0x44	Read-Out status
E	0x45	Read-Out complete status
a	0x61	Write time
b	0x62	Read-Out time
c	0x63	Write company header
d	0x64	Read-Out company header
e	0x65	Write all sensor parameters
f	0x66	Read-Out all sensor parameters
g	0x67	Change protocol setup
k	0x6B	ENTER
l	0x6C	PLUS
m	0x6D	MINUS
n	0x6E	ESC

4.6.2.2 Read-Out of current sensor parameters:

Sensor designation	8Byte	ASCII
Display final value	2Byte	packed BCD-figure
Unit	3Byte	ASCII
Sensor type and digit	1Byte	0xAB: A ... Sensor type, B ... digit of the dec. point (binary coded) Sensor type: 0xXXXX XXXX |||| 0000 ... active with calibration control 0%load and 100% load calibration 0001 ... active without calibration control 0%load and 100% load calibration 0010 ... active without calibration control 0%load calibration and edit 100%load V 0011 ... active without calibration control edit 0%load V and 100%load V 0100 ... passive with calibration control 0%load and 100% load calibration 0101 ... passive without calibration control 0%load and 100% load calibration 0110 ... passive without calibration control 0%load calibration and edit 100% load in mV/V 0111 ... passive without calibration control edit 0%load and 100% load in mV/V 1000 ... current 0%load and 100% load calibration 1001 ... current 0%load calibration and edit 100%load in mA 1010 ... current edit 0%load mA and 100%load mA Dec. point: 0xXXXX XXXX |||| |000 ... _5000___ |001 ... _5,000__ |010 ... _50,00__ |011 ... _500,0__ |100 ... 5,000___
0%load	2Byte	HEX-value (MSB/LSB)
100% load	2Byte	HEX- value (MSB/LSB)

4.6.2.3 Read out status:

Status 2Byte, general error condition of the E3907

4.6.2.4 Read-Out complete status:

Status	2Byte	general error condition of the GM 80
Measuring rate	1Byte	0x01 … 1000/sec 0x02 … 100/sec 0x03 ... 10/sec 0x04 ... 1/sec
Average value	1Byte	0x01 ... x/1 0x02 ... x/2 0x04 ... x/4 0x08 ... x/8 0x10 ... x/16 0x20 ... x/32
SCI_MODE	1Byte	0x00 ... interface off 0x04 … hand mode 0x08 … automatic mode 0x0C … trigger mode
SCI_MODE_DELAY	1Byte	0x02 …10ms 0x03 … 100ms 0x04 … 1s 0x05 … 10s 0x06 ... 1min 0x07 ... 10min 0x08 ... 1h
LOGGMODE	1Byte	0x00 ... logger off 0x04 ... hand mode 0x08 ... automatic mode 0x0C ... graph mode 0x10 ... screen mode
LOGGMODE_DELAY	1Byte	0x01 … 1ms 0x02 …10ms 0x03 … 100ms 0x04 … 1s 0x05 … 10s 0x06 ... 1min 0x07 ... 10min 0x08 ... 1h
Language	1Byte	0x00 ... GERMAN 0x02 ... ENGLISH 0x04 ... FRENCH 0x06 ... SPANISH
Protocol status	1Byte	0xXXXX XXXX (binary coded) |||| |||| |||| |||1 ... do not send conclusion character |||| ||1 ... send CR/LF |||| |1 ... send CR |||| 1 ... send LF

4.6.2.5 Read time

The writing is identically with the data block for receipt of time, however, the data block for writing is protected with a checksum and the corresponding weighted checksum

4.6.2.6 Read time

DAY.MONTH.YEAR

2xspace

HOURS:MINUTES:SECONDS

4.6.2.7 Write company header

The input is ended either if 256 characters are received or if the character ETX (0x03) Strg-C is contained in the character string.

4.6.2.8 Read Company Header

With this command the company header, which is stored in the E3907, can be read.

4.6.2.9 Write all parameters

The write-data block for all sensors is identical to the received read all parameters-data block. However for the writing of sensor parameters a checksum and the corresponding weighted checksum is required**.**

4.6.2.10 Read all parameters

The output of all parameters from sensor 1 to sensor 10 occurs in following sequence:

- Sensor designation
- Final display value
- Unit
- Sensor type (calibration type) / decimal place
- Calibration values 0% load, 100% load with respectively 2 bytes

For this see command read-out of current sensor parameters.

4.6.2.11 Change protocol setup

Protocol status	1Byte	0xXXXX XXXX (binary coded) |||| |||| |||| |||1 ... no closing character is sent |||| ||1 ... send CR/LF |||| |1 ... send CR |||| 1 ... send LF

4.6.2.12 Calculation of the Checksum (CS) and the Weighted Checksum (wCS)

The calculation takes place via all parameter bytes (without the command byte). At the CS all bytes are added (overflows are not considered here). For the calculation of the wCS the CS is added to the wCS. At overflow the wCS is incremented by 1.

4.6.3 Handling with serial interface / USB

Formatting the serial interface output:

Output format in SCI mode:

HAND:		Algebraic sign, measured value, unit, time and CRLF
AUTO:	**10ms**	Signed integer and CRLF
	100ms	Signed integer and CRLF
	1s	Algebraic sign, measured value, unit, time and CRLF
	10s	Algebraic sign, measured value, unit, time and CRLF
	1min	Algebraic sign, measured value, unit, time and CRLF
	10min	Algebraic sign, measured value, unit, time and CRLF
	1h	Algebraic sign, measured value, unit, time and CRLF
TRIGGER:		Signed integer and CRLF

Output Format in LOGG mode:

HAND:	Algebraic sign, measured value, unit, time and CRLF
AUTO:	Algebraic sign, measured value,unit and CRLF
DIAGRAM:	Algebraic sign, measured value,unit and CRLF
WINDOW:	Algebraic sign, measured value,unit and CRLF

Adjustments in the SCI Mode
SCI OFF: At this adjustment a transfer of measured values from the E3907 is disabled. The E3907 can be controlled however with the E3907-commands.

HAND: In this mode a measured value is issued via the serial interface when the Enter key is pressed at the E3907.

AUTO: In this mode a measured value is issued via the serial interface in the adjusted delay

TRIGGER: At a trigger event In this mode, a measured value is written in the logger. Since the trigger pulses may occur in 10ms raster and additional time-logg is not possible. The flank of the trigger pulse must be on HIGH for at least 4ms. Then it must be on LOW for at least 6ms.

WINDOW: This mode reacts to increasing, respectively decreasing flanks. With a decreasing flank the logging of the measured values is started. Now the measured values are written in the data logger in 1ms raster. A decreasing flank ends the recording.

4.6.4 Operation and function principle of the E3907-Data Logger

The data logger can, if the E3907 is not in the measuring mode, be read by the menu option 2,7 LOGG - SENDING or by the command "A" via the interface. Outside of the measuring mode the data logger is deleted only by the menu option 2,7 LOGG - DELETION.

If the E3907 is in the measuring mode, the data logger can be read with the command "A" and be deleted with the command "B".

If the measuring mode is being switched on from the menu option 1MEASURING-sensor selection,
the starting time of the measurement, the current sensor designation, the final value of the measuring range, the adjusted measuring rate and the logger mode (e.g.: AUTO 1ms) are saved in the logger.

NOTE: All previous measured values are deleted here!

With the read-out of the data logger via the serial interface different adjustments are sent from the E3907.

a) Company header
b) Starting time of the measurement
c) Sensor designation
d) Final display value
e) Adjusted measuring rate
f) Adjusted logger mode
g) Thereafter the measured values

In the HAND MODE the measured values are always logged with the time. The measured value is logged at the data in the AUTOMODE. A time can be assigned to each measured value by the indicated starting time.
Since in GRAPHS and in the WINDOW MODE trigger events smaller than 1sec can occur, an additional time log is not possible.

Adjustments in the Logg Mode

LOGG OUT: Here the data logger is switched off. The logg mode in the measuring mode is switched to "LOGG OUT" as soon as the entire data logger has been edited.

HAND: In this mode a measured value is written into the data logger when the enter key was pressed at the E3907. By an additional logg of time, there is a time assignment for each measured value.

AUTO : In this mode in the adjusted Delay a measured value is written into the data logger. By the stored starting time there is a time assignment for each measured value.

GRAPH: In this mode at a trigger event a measured value is written into the logger. Since the trigger pulses occur in 10ms raster, an additional logg of the time is not possible. The flank of the trigger pulse must stand on HIGH for 4ms at least. Afterwards on LOW for at least 6ms.

WINDOW: This mode reacts to increasing and/or decreasing flanks. At an increasing flank the logging of the measured values is started. From now on the measured values are written in the data logger with 1ms raster. A decreasing flank ends the recording LOGG OUT.

4.7 Calibration

4.7.1 Calibrate the active sensor with control (ACT wCON)

Calibration possibilities:

- After pressing the **ENTER** key, the automatic calibration begins. The device will read the 0% Load value and display WARM UP. After that the 100% Load value will be read and the device will display WARM UP. After the WARM UP is finished the device will display SAFE?. Press **ENTER** to confirm or **ESC** to reject**.**

4.7.2 Calibrate the active sensor without control (ACT nCON)

Calibration:

- measure 0% Load and measure 100% Load
- measure 0% Load and enter the difference [100% Load in V – 0% Load in V]
- enter 0% Load in V and enter difference [100% Load in V – 0% Load in V]

Press key ▲ or ▼ and choose between 0% Load or Sensitivity
0% Load - Relieve sensor from load
or Sensitivity - Enter the value fort the sensitivity in V

Press Key ▲ or ▼ and choose between 100% Load or Sensitivity
100% Load - Calibrate with 100% Load
or Sensitivity - Enter the value for the sensitivity in V

SAFE - Accept calibration values

4.7.3 Calibrate the passive sensor with control (ACT wCON)

Calibration:

The device will read the 0% Load value and display WARM UP. After that the 100% Load value will be read and the device will display WARM UP. After the WARM UP is finished the device will display SAFE?. Press ENTER to confirm or ESC to reject.

4.7.4 Calibrate the passive sensor without control (ACT nCON)

Calibration:

- measure 0% Load and measure 100% Load
- measure 0% Load and enter 100% Load in mV/V
- enter 0% Load in mV/V and enter 100% Load in mV/V

Press key ▲ or ▼ and choose between 0% Load or Sensitivity
0% Load - Relieve sensor from load
or Sensitivity - Enter the value fort the sensitivity in V
Press Key ▲ or ▼ and choose between 100% Load or Sensitivity
100% Load - Calibrate with 100% Load
or Sensitivity - Enter the value for the sensitivity in mV/V

SAFE - Accept calibration values.

4.7.5 Calibrate with current 4-20mA

Calibration:

- measure 0% Load and measure 100% Load
- measure 0% Load and enter 100% Load value in mA.
- enter value for 0% Load in mA and enter 100% Load value in mA

Press key ▲ or ▼and choose between 0% Load or Sensitivity
0% Load - Relieve sensor from load
or Sensitivity - Enter the value fort the sensitivity in mA (4-20 mA)

Press Key ▲ or ▼ and choose between 100% Load or Sensitivity
100% Load - Calibrate with 100% Load
or Sensitivity - Enter the value for the sensitivity in mA

SAFE - Accept calibration values

Notice:

If you cannot chose a sensor or it does not run in measure mode, the parameters deposited for this sensor are wrong / wrong calibration. → New calibration

4.8 Interface and Connectivity

4.8.1 Connection for strain gauge sensors:

Power suppy via E3907: 5VDC max. 20mA, short circuit protected
Bridge resistance: min. 350 Ohm, only full bride, 4- or 6-conductor
Sensitivity: up to 3,3mV/V, other values on request
100% control: via E3907 applied via control input

4.8.2 Connection for active Sensors:

Voltage input: 0…±10VDC, max. 5mA, output resistance < 1Ohm
Current inputS: 0…20mA, 4…20mA, an 75Ohm burden

4.8.3 Visual evaluation:

Display: 8-digit LCD display with backlight

4.8.4 Trigger input:

The device has an electrically isolated control input: Trigger. This input can e.g. be controlled with a PLC, a remote switch, a foot switch, etc..
As a control signal, the following voltage levels are applied for each logic state at the jack:

Logic state	Low level	High level
Voltage level	**0 V – 2 V**	**3,5 V – 27 V**
State	**inactive**	**active**

Depending on the setting, data can hereby either be logged or transferred as interface data output. This input has a high sampling rate and therefore are also very short pulses detected.
2 pol jack: Trigger

4.8.5 RS232 / USB:

The E3907 uses for the serial data transfer either an RS232 or a USB interface.

5. Product phases

5.1 Transport

Notation:


Please pack the devices suitable for the transportation.


The device may not be movable in the packaging.


Please protect the device from moisture.

5.2 Commissioning and installation

Security measures before installation:

Attention:


The information for the voltage supply in section 5.2 must be respected.

Cable connections:

Attention:


Never connect voltage supply on non-used pins.

5.3 Normal operation

EMC:

Attention:


Do not expose the device to higher EMC loads as specified in the standard**.**

Cable:

Attention:


Never disconnect by pulling the cable, always directly at the connector.

Storage:

Notation:


Only store in dry and dust-free rooms.


During storage, please remove batteries**.**

5.4 Maintenance and cleaning

Cleaning:

Warning:

Always switch of voltage supply before cleaning.

Attention:

Clean the housing with a soft, damp cloth. Do not use solvents, as these may damage the front panel labeling and display panel.

When cleaning, make sure that no liquid gets into the equipment or connections.

Battery change:

Attention:

Pay attention to the polarity of the batteries.

Preventive maintenance and inspection:

Notation:

Check the plug connections.

Repair:

Notation:

The products contain no parts that need to be or that can be serviced by the user himself. Repairs may only be carried out by the tecsis GmbH. If it can be assumed that safe operation of the unit is no longer possible, it has to be put out of operation and secured against accidental operation. This applies in particular, if:

- the device is visibly damaged.
- the device is non-functional.
- parts of the device are loose.
- the trunk shows visible damage.

5.5 Information for the safe disposal

Disposal:

Please dispose of the batteries and the device according to the current regulations. You fulfill your legal obligations and help protect the environment!

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